

Ser. No. 09/939,211

- 3 -

Response to Office Action of 11 September 2003

Atty Docket 117163-23

AMENDMENT TO CLAIMS

Please make the following amendments to result in this listing of claims:

1. (currently amended) A stent, ~~in particular a peripheral stent~~, for expansion from a first condition in which it can be introduced into a vessel into a second condition in which it holds the vessel in an expanded state, comprising:

a plurality of annular support portions comprising bar elements which are connected in a longitudinal direction of the stent by way of a plurality of connecting bars,

wherein the connecting bars between a first said annular support portion and, in the longitudinal direction, an adjacent second said annular support portion engage in a region of the bar elements of the first annular support portion that projects in the longitudinal direction; and

wherein the connecting bars engage a central portion of the second annular support portion with respect to the longitudinal direction ~~stent is displaceable with respect to a sheathing that bears at least in a portion-wise manner thereagainst in a first direction without hooking engagement on the sheathing.~~

Claims 2-4. (cancelled)

^{11/2}5. (previously presented) The stent of claim 1, wherein at least a first said annular support portion and a second said annular support portion in adjacent relationship ^{in the} first direction ^{are} each formed by a respective bar element extending in a meander configuration in a peripheral direction of the stent and the connecting bars between the first said annular support portion and the second said annular support portion engage near a turning point, adjoining the second said support portion, of the bar element of the first said support portion.

6. (currently amended) The stent of claim 5, wherein the respective connecting bar respectively engages a point that projects furthest in the longitudinal first direction, of the bar element of the first said annular support portion.

7. (cancelled)

BEST AVAILABLE COPY

Ser. No. 09/939,211

- 4 -

Response to Office Action of 11 September 2003

Atty Docket 117163-23

8. (currently amended) The stent of claim 5 [[7]], wherein at least the second said annular support portion is formed by a bar element that extends a meander configuration in the peripheral direction of the stent and the connecting bars engage in the central region of the bar element between the turning points of the bar element, with respect to the longitudinal direction of the stent.

9. (previously presented) The stent of claim 1, wherein the connecting bars are sufficiently long to ensure flexibility of the stent with respect to its longitudinal direction.

10. (previously presented) The stent of claim 1, wherein the connecting bars are designed and arranged to avoid twisting of the stent over its length.

11. (currently amended) The stent of claim 10, wherein the connecting bars are arranged in the longitudinal direction of the stent individually or in a portion-wise manner on alternate sides with respect to lines extending along the longitudinal direction of the stent, in such a way that a change in angle is imparted in opposite directions individually or in portion-wise manner at least to their points of engagement, which are in the longitudinal first direction, on the bar elements, upon expansion of the stent, in a plane tangential to a the peripheral surface of the stent.

12. (currently amended) The stent of claim 1, wherein the stent expands in a self-induced manner from the first condition into the second condition, ~~as a result of removal of the sheathing device from the stent, which removal occurs in the first direction with respect to the stent,~~ the stent having a plurality of annular support portions comprising bar elements that are connected in the longitudinal direction of the stent by way of connecting bars, such that ~~when the sheathing device is not yet completely removed the stent can be restored to its first condition again by producing a relative movement of the sheathing device with respect to the stent in a second direction opposite to the first direction without hooking engagement on the sheathing device.~~

BEST AVAILABLE COPY

Ser. No. 09/939,211

- 5 -

Response to Office Action of 11 September 2003

Atty Docket 117163-23

13. (currently amended) The stent of claim 12, wherein the bar elements and the connecting bars are of such a configuration and arrangement that ~~when the sheathing device is not yet completely removed~~ the stent can be restored to its first condition again ~~by producing a relative movement of the sheathing device with respect to the stent in the second direction without hooking engagement on the sheathing device.~~

112 14. (currently amended) The stent of claim 13, wherein the connecting bars between a first said annular support portion and a second said annular support portion in adjacent relationship (in the first direction) engage in the region of the portions, which project in the first direction, of the bar elements of the first annular support portion ~~to prevent hooking engagement between the stent and the sheathing device~~ when the stent is restored to its first condition.

15. (currently amended) The stent of claim 1 [[14]], wherein the stent material includes a shape memory alloy, in particular a nickel-titanium alloy.

16. (previously presented) The stent of claim 15, wherein at body temperature the stent material is in a stress-induced martensitic state in the first condition of the stent and in an austenitic state in the second condition of the stent.

17. (previously presented) The stent of claim 16, wherein the bar elements have a geometry and/or a width of the bar elements varies over the length thereof in such a way that the stresses which occur in the bar elements are below the respective plastic deformation limit of the stent material when the stent material makes the transition in the first condition of the stent from the martensitic state into a stress-induced martensitic state as a result of an increase in temperature.

112 18. (previously presented) The stent of claim 17, wherein at least one said annular support portion is formed by a bar element which extends in a meander configuration in the peripheral direction of the stent and whose width decreases towards the center between two turning points.

BEST AVAILABLE COPY

Ser. No. 09/939,211

- 6 -

Response to Office Action of 11 September 2003

Atty Docket 117163-23

19. (previously presented) The stent of claim 18, wherein at least one said annular support portion is formed by a bar element that extends in a meander configuration in the peripheral direction of the stent and that has a direction of curvature which changes in the central region between two turning points.

20. (previously presented) The stent of claim 19, wherein at least one said annular support portion is formed by a bar element that extends in a meander configuration in the peripheral direction of the stent and of which at least a center line is in the shape of an elliptical arc segment in the region of the turning points.

21. (previously presented) The stent of claim 20, wherein at least one said annular support portion is formed by a bar element that extends in a meander configuration in the peripheral direction of the stent wherein each two bar element portions that are adjacent in the peripheral direction of the stent and that extend between the turning points form the limbs of a V-shape.

Claims 22, 23 (cancelled)

112 24. (currently amended) A catheter arrangement comprising:

a stent, for expansion from a first condition in which it can be introduced into a vessel into a second condition in which it holds the vessel in an expanded state, said stent comprising a plurality of annular support portions comprising bar elements which are connected in a longitudinal direction of the stent by way of a plurality of connecting bars, and

a catheter, said catheter comprising a distal end, in the region of which a sheathing device is provided for receiving the stent in its first condition, and a device for producing a relative movement between the sheathing device and the stent in the first longitudinal direction thereof, wherein a device is provided for producing the relative movement between the sheathing device and the stent in a second longitudinal direction

BEST AVAILABLE COPY

Ser. No. 09/939,211

- 7 -

Response to Office Action of 11 September 2003

Atty Docket 117163-23

opposite and a device for holding the stent during said relative movement in the second direction,

wherein the stent is displaceable with respect to the sheathing device that bears at least in a portion-wise manner thereagainst in a first direction without hooking engagement on the sheathing device.

25. (withdrawn) A method of positioning a stent of claim 1 in a vessel, said method comprising the steps of:

moving the stent in a first step in a first condition to an expansion location; and
expanding the stent at least partially in a second step;

wherein the position of the stent is detected with respect to the expansion location in a checking step, characterized in that in the second step the stent is only partially expanded and in at least one correction step the stent is put into a third condition in which it is in a sheathing device and its position with respect to the expansion location is modified.

26. (withdrawn) The method of claim 25, wherein:

in the first step the stent is moved in a sheathing device to the expansion location, in the second step the stent is partially expanded by partial or after partial removal of the sheathing device from the stent and in the correction step the stent is put into a third condition in which it is in the sheathing device and its position with respect to the expansion location is modified.

Claims 27-43 (cancelled)

44. (previously presented) The stent of claim 5, wherein the connecting bars are sufficiently long to ensure flexibility of the stent with respect to its longitudinal direction.

Claims 45- 49 (cancelled)

BEST AVAILABLE COPY

Scr. No. 09/939,211

- 8 -

Response to Office Action of 11 September 2003

Atty Docket 117163-23

50. (previously presented) The stent of claim 10, wherein the connecting bars are designed and arranged to avoid twisting of the stent over its length.

Claims 51-56 (cancelled)

57. (currently amended) The stent of claim 50, wherein the connecting bars are arranged in the longitudinal direction of the stent individually or in a portion-wise manner on alternate sides with respect to lines extending along the longitudinal direction of the stent, in such a way that a change in angle is imparted in opposite directions individually or in portion-wise manner at least to their points of engagement, which are in the longitudinal first direction, on the bar elements, upon expansion of the stent, in a plane tangential to the peripheral surface of the stent.

Claims 58-63 (cancelled)

64. (previously presented) The stent of claim 11, wherein the stent expands in a self-induced manner from the first condition into the second condition, ~~as a result of removal of the sheathing device from the stent, which removal occurs in the first direction with respect to the stent;~~ the stent having a plurality of annular support portions comprising bar elements that are connected in the longitudinal direction of the stent by way of connecting bars, such that ~~when the sheathing device is not yet completely removed the stent can be restored to its first condition again by producing a relative movement of the sheathing device with respect to the stent in a second direction opposite to the first direction without hooking engagement on the sheathing device.~~

Claims 65-66 (cancelled)

67. (currently amended) The stent of claim 5, wherein the stent expands in a self-induced manner from the first condition into the second condition, ~~as a result of removal of the sheathing device from the stent, which removal occurs in the first direction with respect to the stent;~~ the stent having a plurality of annular support portions comprising

BEST AVAILABLE COPY

Ser. No. 09/939,211

- 9 -

Response to Office Action of 11 September 2003

Atty Docket 117163-23

bar elements that are connected in the longitudinal direction of the stent by way of connecting bars, such that ~~when the sheathing device is not yet completely removed the stent can be restored to its first condition again by producing a relative movement of the sheathing device with respect to the stent in a second direction opposite to the first direction without hooking engagement on the sheathing device.~~

Claims 68-69 (cancelled)

70. (currently amended) The stent of claim 67, wherein the bar elements and the connecting bars are of such a configuration and arrangement that ~~when the sheathing device is not yet completely removed the stent can be restored to its first condition again by producing a relative movement of the sheathing device with respect to the stent in the second direction without hooking engagement on the sheathing device.~~

Q 112 71. (currently amended) The stent of claim 13, wherein the connecting bars between a first said annular support portion and a second said annular support portion in adjacent relationship in ~~the first direction~~ engage in the region of the portions, which project in the first direction, of the bar elements of the first annular support portion ~~to prevent hooking engagement between the stent and the sheathing device when the stent is restored to its first condition.~~

Claim 72-73 (cancelled)

112 74. (currently amended) The stent of claim 67, wherein the connecting bars between a first said annular support portion and a second said annular support portion in adjacent relationship in ~~the first direction~~ engage in the region of the portions, which project in the first direction, of the bar elements of the first annular support portion ~~to prevent hooking engagement between the stent and the sheathing device when the stent is restored to its first condition.~~

Ser. No. 09/939,211 - 10 -
Response to Office Action of 11 September 2003
Atty Docket 117163-23

112 75. (currently amended) The stent of claim 70, wherein the connecting bars between a first said annular support portion and a second said annular support portion in adjacent relationship in [✓]the first direction engage in the region of the portions, which project in the first direction, of the bar elements of the first annular support portion ~~to prevent hooking engagement between the stent and the sheathing device when the stent is restored to its first condition.~~

112 76. (currently amended) The stent of claim 12, wherein the connecting bars between a first said annular support portion and a second said annular support portion in adjacent relationship in the first direction engage in the region of the portions, which project in the first direction, of the bar elements of the first annular support portion ~~to prevent hooking engagement between the stent and the sheathing device when the stent is restored to its first condition.~~

77. (previously presented) The stent of claim 12, wherein the stent material includes a shape memory alloy, in particular a nickel-titanium alloy.

78. (previously presented) The stent of claim 77, wherein at body temperature the stent material is in a stress-induced martensitic state in the first condition of the stent and in an austenitic state in the second condition of the stent.

Claims 79-80 (cancelled)

81. (previously presented) The stent of claim 67, wherein the stent material includes a shape memory alloy, in particular a nickel-titanium alloy.

82. (previously presented) The stent of claim 81, wherein at body temperature the stent material is in a stress-induced martensitic state in the first condition of the stent and in an austenitic state in the second condition of the stent.

Claims 83-84 (cancelled)

BEST AVAILABLE COPY

Ser. No. 09/939,211

- 11 -

Response to Office Action of 11 September 2003

Atty Docket 117163-23

85. (previously presented) The stent of claim 78, wherein the bar elements have a geometry and/or a width of the bar elements varies over the length thereof in such a way that the stresses which occur in the bar elements are below the respective plastic deformation limit of the stent material when the stent material makes the transition in the first condition of the stent from the martensitic state into a stress-induced martensitic state as a result of an increase in temperature.

86. (previously presented) The stent of claim 85, wherein at least one said annular support portion is formed by a bar element which extends in a meander configuration in the peripheral direction of the stent and whose width decreases towards the center between two turning points.

Claims 87-88 (cancelled)

89. (previously presented) The stent of claim 82, wherein the bar elements have a geometry and/or a width of the bar elements varies over the length thereof in such a way that the stresses which occur in the bar elements are below the respective plastic deformation limit of the stent material when the stent material makes the transition in the first condition of the stent from the martensitic state into a stress-induced martensitic state as a result of an increase in temperature.

90. (previously presented) The stent of claim 89, wherein at least one said annular support portion is formed by a bar element which extends in a meander configuration in the peripheral direction of the stent and whose width decreases towards the center between two turning points.

Claims 91-92 (cancelled)

93. (previously presented) The stent of claim 78, wherein at least one said annular support portion is formed by a bar element that extends in a meander configuration in the

2
BEST AVAILABLE COPY

Ser. No. 09/939,211

- 12 -

Response to Office Action of 11 September 2003

Atty Docket 117163-23

peripheral direction of the stent and that has a direction of curvature which changes in the central region between two turning points.

94. (previously presented) The stent of claim 78, wherein at least one said annular support portion is formed by a bar element that extends in a meander configuration in the peripheral direction of the stent and of which at least a center line is in the shape of an elliptical arc segment in the region of the turning points.

95. (previously presented) The stent of claim 78, wherein at least one said annular support portion is formed by a bar element that extends in a meander configuration in the peripheral direction of the stent wherein each two bar element portions that are adjacent in the peripheral direction of the stent and that extend between the turning points form the limbs of a V-shape.

Claims 96-98 (cancelled)

99. (previously presented) The stent of claim 82, wherein at least one said annular support portion is formed by a bar element that extends in a meander configuration in the peripheral direction of the stent and that has a direction of curvature which changes in the central region between two turning points.

100. (previously presented) The stent of claim 82, wherein at least one said annular support portion is formed by a bar element that extends in a meander configuration in the peripheral direction of the stent and of which at least a center line is in the shape of an elliptical arc segment in the region of the turning points.

101. (previously presented) The stent of claim 82, wherein at least one said annular support portion is formed by a bar element that extends in a meander configuration in the peripheral direction of the stent wherein each two bar element portions that are adjacent in the peripheral direction of the stent and that extend between the turning points form the limbs of a V-shape.

BEST AVAILABLE COPY

Ser. No. 09/939,211

- 13 -

Response to Office Action of 11 September 2003

Atty Docket 117163-23

2

Claims 102-104 (cancelled)

BEST AVAILABLE COPY